

# NORTHWARD RANGE EXTENSION IN FLORIDA OF THE INVASIVE FERN *LYGODIUM MICROPHYLLUM* (LYGODIACEAE)

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## ABSTRACT

A newly recognized population of the dangerous invasive fern *Lygodium microphyllum* has been found in Orange County in central Florida. This population of the weed is known to have persisted within a cypress swamp for almost 15 years, during which time the area experienced single or multi-night freezes of -2.5 to -5.5°C. This finding indicates that the weed could live in other USDA Cold Hardiness Zone 9 areas such as southern Texas, which the fern may be able to reach via its wind-borne spores.

## RESUMEN

Se encontr  en el Condado de Orange, en el centro de la Florida, una poblaci n reconocida recientemente del helecho invasivo y peligroso, *Lygodium microphyllum*. Se sabe que esta poblaci n de maleza ha persistido durante 15 a os en una ci naga de cipr s donde fue encontrado, durante tal periodo de tiempo el  rea experiment  heladas de -2.5 hasta -5.5 C durante una o m s noches. Esta observaci n indica que la maleza podr a vivir en otras  reas de la Zona de Resistencia al Fr o (USDA) Numero 9, tal como el sur de Tejas,  rea que el helecho puede alcanzar por las esporas llevadas por el viento.

***Lygodium microphyllum*** (Cav.) R.Br. (Lygodiaceae), known as Old World climbing fern, is considered to be the most serious weed of swamps and other moist habitats in southern Florida (Pemberton & Ferriter 1998). The weed is a severe problem because it dominates and displaces native vegetation, is spreading rapidly, and lacks adequate or affordable control measures. The fern is native to the Old World subtropics and tropics (Pemberton 1998), and was first found to be naturalized in Martin County in 1965 (Beckner 1968). Since then, the plant has spread to infest numerous susceptible habitats in all the Florida counties south of the northern shore of Lake Okeechobee. The weed covered an estimated 40,500 ha in Florida as of 1999 (A. Ferriter pers. comm.), and has expanded considerably since then. For instance, the infestation in Everglades National Park was estimated to occupy 810 ha in December 2002, but ca. 4,050 ha in August, 2003, despite aggressive aerial spraying with herbicides (T. Pernas and J. Taylor pers. comm.). The fern occurs much more sporadically north of Lake Okeechobee but is becoming more abundant. Prior to this report, the known northern limits of *L. microphyllum* were near Nalcrest in southeast Polk County and at a site in southern Brevard County (Pemberton & Ferriter 1998), both at



ca. 27° 50' latitude. The Brevard County population is probably recent, first detected in 1997 (specimen sent to and confirmed by the author by M.A. Poole), but the Polk County population was present at least since 1979, when a herbarium sample (Willson 353, FLAS!) was collected.

During January 2003, an unrecognized population of *L. microphyllum* was examined in a cypress swamp east of Orlando. This site, at 28°30'42"N, represents a 70 km northern range extension of the plant.

Voucher specimens: **U.S.A. Florida. Orange Co.:** Eastern Service Area Wetland Treatment Facility on the W side of Alafa, Trail, 3 km S of Hwy. 408, ca. 8 km E of Orlando, along the boardwalk growing on bald cypress and other plants within the swamp, 27 Jan 2003, Robert Pemberton s.n. (USF).

Patches of the fern are present across an area of ca. 2 ha within the site, where the fronds twine up cypress tree trunks, *Taxodium distichum* (L.) Rich. forming large skirts consisting of living intertwined fronds layered over dead but persistent strands of rachis ("stems"). The large size of these skirts, like those in the long-established populations of the weed in southern Florida, indicates that this Orange County population is not new. *Lygodium microphyllum* was found during a vegetation analysis of this wetland during 1989, 1990, and 1991, but misidentified as *Lygodium japonicum* (Thunb.) Sw. (L. Swartz, Camp Dresser and McKee Inc., here forth CDM Inc., unpublished reports). *Lygodium japonicum* is the other invasive climbing fern that has naturalized in Florida, and the two species are often confused. *Lygodium japonicum* rarely occurs in deeper wetlands such as swamps, but it can't survive constant standing water like *L. microphyllum*. *Lygodium japonicum* has sterile pinnules ("leaflets") that are lobed or dissected, whereas *L. microphyllum* only occurs at wet sites in Florida and has sterile pinnules that are usually unlobed. Furthermore, *L. japonicum* is common in northern and central Florida (and occurs widely in the Southern states), but *L. microphyllum* occurs, with a few exceptions such as this one, in the southern third of Florida.

The occurrence of this newly recognized population of *L. microphyllum* in the northern part of Orange County, and its persistence for almost 15 years, demonstrates the plant's ability to tolerate significant single-night freezes. This population, which was first found by CDM Inc. staff during July 1989, survived the 1989 Christmas freeze when temperatures dropped to -2.5–5.5°C during the three day period (Orlando International Airport Weather Station #6628 records). On all three dates (Dec. 23, 24, and 25), the daytime temperatures climbed above freezing. The airport is ca. 13 km to the southwest of the population. This more northerly occurrence indicates that the plant's ability to endure lower temperatures of short duration is greater than previously recognized. The observations suggest that *L. microphyllum* may be able to colonize additional areas in central Florida, and probably northward, especially along the relatively mild east coast of the state. The fact that *L. microphyllum* has not come to dominate the Orange County cypress swamp, despite being there for ca. 15 or more



years, suggests that the weed is not as aggressive in central Florida as it is in southern Florida. The ability of this fern to colonize and persist in central Florida, in USDA-Cold Hardiness Zone 9 (Cathey 1990), as well that wetlands in southern Texas and Louisiana are climatically suitable for the weed. The plant produces large numbers of spores and occurs on many oceanic islands within its native range both of which suggest that it may be able to reach these areas via its wind-borne spores (Pemberton & Ferriter 1998). Because this fern's gametophytes are self fertile (Lott et al. 2003), only one spore is needed to start a new infestation. Biological control may have the potential to control this weed (Pemberton, 1998); a suite of specialist insect and mite herbivores is currently being evaluated (Pemberton et al. 2002; Goolsby et al. 2003).

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